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OCCUPANCY EXERCISE RESEARCH GUIDE:

An Introduction to the Research Use of the Shelter Exercise for Training

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Prepared For:
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Contract No. OCD-OS-63-97
Subtask 1517A

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Institute for Performance Technology
AMERICAN INSTITUTES FOR RESEARCH
Pittsburgh, Pennsylvania

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INTRODUCTION

An occupancy exercise may be defined as a planned portion of a civil defense training course in which students are brought together for an extended period of time to experience some of the conditions of shelter living. The occupancy exercise is an indispensable part of shelter management training. Both students and instructors overwhelmingly report that the shelter exercise conveys to trainees the meaning of shelter living, in a way that lectures and visual aids cannot duplicate.

The shelter exercise can also be used as a source of occupancy research data which can be obtained from relatively simple behavioral science techniques. It has been demonstrated that valuable information on a wide variety of shelter phenomena can be obtained from the shelter stay without interfering with the training goals of the exercise and with minimum additional effort. Such information can be of direct use to many participants in the civil defense program, from the individual shelter management instructor to persons at the highest policy-making levels of the Office of Civil Defense.

However, tapping the research potential of the occupancy exercise requires planning, coordination, and rigorous execution of established procedures. The purpose of this document is to present guidelines for obtaining research data from occupancy training exercises. It is intended for an audience of persons who are knowledgeable about shelter management but who have had little or no formal training in behavioral science research. It should be regarded as an introduction to a complex research endeavor, and not as a complete handbook on the subject of occupancy research.

THE USE OF OCCUPANCY EXERCISE DATA

Some of the ways in which information accumulated from many shelter exercises can be of direct benefit to the Office of Civil Defense are described below.

Data about Condition of OCD Supplies ("Quality Control" Data)

At present, the three OCD training centers act informally as "quality control" agents for OCD. That is, when they discover supply items that fall below specifications, or are missing or incomplete, this information is reported through channels to the appropriate office within the Civil Defense Agency. This acitivity is limited by (a) the relatively small number of occupancy exercises held annually by the OCD training centers, (b) their limited geographical coverage, and (c) the informal nature of the "quality control" operations.

As part of an occupancy exercise research program, data can be collected on the amount and condition of the supplies used in every occupancy exercise. This could mean perhaps as many as 500 reports a year from all areas of the country, covering most of the producers of the various OCD supplies.

Survey and Test of Operational Procedures

Occupancy exercises provide a simple and realistic way to survey the effectiveness of the techniques for the use of survival stocks that have been recommended by OCD and by the producers of supplies. The experiences of shelter management instructors in improvising solutions to operational problems (such as the problem of tapping the OCD water drum) would be valuable data to collect and analyze.

When new or modified operational procedures are developed by OCD, they can be tested in occupancy exercises before they are made part of guidance for general distribution.

Evaluation of Factors that Affect Shelter Management

The analysis of results from occupancy exercises can uncover potential problems in shelter management which may not have been dealth with in the training course. For example, the fact that occupancy exercises are held in many different types of shelters permits at least a cautious consideration of the effects of physical layout upon shelter management. This includes the shape of the shelter (a tunnel shape vs. a square shelter) and its configuration (single area vs. multiple areas).

In addition, much data can be collected on people's physical and emotional responses to confinement. These data can prove useful additions to the corpus of knowledge about human behavior under shelter or shelter-like conditions, as long as the research limitations of the occupancy exercise are kept in mind.

Improvement of Training

Data derived from shelter exercises can assist instructional staffs in organizing the exercise for maximum training value. For example, how many student shelter managers are optimum for an exercise: one to manage for the entire exercise, or two, splitting the time, or should as many students as possible have a chance to operate as the shelter manager? Occupancy exercise data can help clarify this training issue. Within the occupancy exercise framework, simple experiments can be conducted to compare the training effectiveness of the single-manager versus the split-management shelter exercise.

Evaluation of Student Performance

An occupancy exercise imposes upon shelterees the requirement to implement what they have previously learned. Therefore, if the exercise takes place towards the end of the course, occupancy research data can be used as another test in evaluating the performance of shelter management students.

The research value of the shelter exercise can be expressed in more general terms. In the event of nuclear attack, fallout shelters throughout the country will be occupied by people of all background, crowded together, frequently in large numbers, under varying degrees of stress and largely untrained in what to expect and what to do. Their survival chances will be enhanced by realistic plans for leadership and management and by dissemination of these plans through training, in advance of any attack. In turn, the adequacy of such pre-attack preparation is related to the amount and quality of knowledge that can be amassed about human behavior under shelter-like conditions.

The occupancy exercise for shelter management training represents a major source of shelter habitability data for the Office of Civil Defense.

THE NATURE OF OCCUPANCY EXERCISE DATA

What types of data can reasonably be expected to emerge from the application of research tools to the shelter exercise? The categories of information pertaining to shelter living that can be obtained from such exercises are listed below.

1. The condition and use of OCD supplies.
2. The availability and use of augmented supplies and equipment.
3. The structure of the shelter and its physical environment.
4. The characteristics and behavior of shelterees.
5. The characteristics and behavior of shelter management.
6. Shelter organization.
7. Shelter operations.
8. Simulated emergencies introduced into the exercise or unplanned critical events occuring during the exercise.
9. Evaluation of the shelter exercise as a training techniques and as an introduction to shelter living.

Specific informational items that fit into each of the above listed categories are presented in Appendix A.

The breadth of the above listed information categories should not create the impression that research data derivable from shelter exercises are limitless. There are a number of natural and imposed constraints upon the occupancy exercise that control the extent to which research can be conducted in this setting. These are discussed on pages 18 and 19.

FORMULATING THE RESEARCH PROBLEM

The first step in planning any scientific investigation is to determine exactly what it is the researcher is interested in studying. Some studies in the behavioral sciences focus upon a very limited aspect of human behavior; others generate data about a multiplicity of activities and attitudes. But no study can examine <u>everything</u> that happens to a given population under given circumstances. Regardless of the scope of the study, it is imperative that the investigator identify the specific segments of the total situation that his research effort will cover. Until this is done, it is impossible to make decisions pertaining to major subsequent steps of the research process, such as selecting the research design, developing the research instruments, and determining the techniques for analysis.

The statement of the research problem can take many forms. It may be phrased as an hypothesis, a statement that two or more variables are systematically related to each other. Even further, it may be in the form of a causal hypothesis, in which a factor of the shelter exercise is suggested as the direct cause of one or more shelter phenomena.

A high percentage of occupancy exercise research studies will not be conducted as tests of specific hypotheses. They will largely be concerned with gathering data towards the goals of identifying, describing, and forming hypotheses about significant features of the shelter experience. Such investigations, called descriptive studies, also require a clear-cut formulation of the research problem, in this case a statement of what aspects of the totality of the shelter situation the investigator wishes to examine

n occupancy exercise study can focus upon a single feature of the shelter xercise, such as medical complaints, or acceptance of the survival ra- ions. On the other hand, it can seek to uncover data in many of the in- ormation categories listed on page 4.

It is important to recognize that there is no inherent virtue in ither a narrow, limited statement of the research problem, or a broad eneral statement. If the scope of the study is too limited, the result- ng data may not be sufficient to describe the resulting phenomena ade- uately. An over-abundance of data, resulting from too broad a statement f the problem, may unduly complicate the data gathering process, as well s the analysis and interpretation of the data. The appropriate state- ent of the research problem should be based upon a consideration of the oals of the study, the characteristics of the people, events and envir- nment which the study will probe, and the research resources available to the investigator.

In the initial planning phases of a research study, it is also nec- ssary to pose the question why this research problem should be investi- ated in an occupancy exercise. The research rationale may be largely a ractical one, a theoretical one, or a combination of the two. An ex- mple of the first category is a study to determine the proportion of the D stocked survival rations that are substandard in quality. A study hat, at the present time, would be largely a theoretical one is illus- rated by an investigation of the comparative effects of high shelter tem- peratures on the performance of males and females.

In developing a rationale for a study, it is highly desirable to know what previous data and hypotheses have been generated in regard to the same or similar research problems. The fact that previous research has been conducted on a specific problem should not deter the investiga- tor from pursuing his original goal. However, the results of previous studies can and should have an impact on the way any additional research on the same problem is conducted.

"Should the study be carried out in an occupancy exercise?" is a question that the research rationale is designed to answer. Of greater practical significance is the question, "Can the study be carried out within the occupancy exercise framework?" As previously mentioned, there are limitations to the research use of the occupancy exercise.

The most important constraint is the possible conflict with training goals. To prevent interference with training, certain types of studies should be excluded from a program of occupancy exercise research. For example, it would be unreasonable to plan a study of the effects of extended periods of darkness (eight hours or more) upon a shelter population of shelter management trainees. An exception would be the case in which a shelter exercise was designed specifically to prepare trainees to manage a shelter under adverse illumination conditions. In a similar vein, it would be undesirable to conduct a study that would require shelter occupants to take tests lasting several hours, both before and after the study, since time is one of the scarcest commodities in the current shelter management training program.

A second limiting factor is the relatively short duration of the shelter exercise for training. Generalizing from a 24 hour shelter stay to a two week period of confinement is rarely warranted. Therefore, occupancy exercise research should largely limit itself to examining phenomena that occur in the first 24-48 hours of a shelter stay, and also phenomena that are relatively unaffected by time, such as supply procedures.

Thirdly, one must ask whether the research problem can be adequately investigated given the size and composition of the shelter population. As far as size is concerned, a study of the effects of different organizational arrangements of task teams and living groups for large shelters would be unwarranted in shelter exercises with 20 or so people. In regard to shelteree characteristics, it should be kept in mind that, for the most part, the participants in shelter exercises are adult males, many with specific civil defense interests and assignments. It is unrealistic to generalize automatically from their attitudes and performance to those of the general population. In exercises that utilize volunteers from the local community, the problem is, to some extent, overcome.

A final step in problem formulation should be mentioned. Before one can proceed with the actual design of the study, it is necessary to consider what types of information will have to be uncovered in order to understand and evaluate the phenomena under investigation. Some of the questions to ask in this regard are:

1. Does the research problem require data about shelteree performance, or about attitudes and opinions, or both?
2. What specific activities or what specific attitude realms are we interested in examining?
3. Is it necessary that this information be gathered during the shelter stay, or can we wait until the exercise is over?
4. Does it appear as if we can get the data at a single time, or will it require repeated applications of the data gathering instruments?
5. Do we want data from every individual in the shelter or only from selected persons?
6. Can the information be obtained without any preparation of the respondents, or are special techniques or equipment necessary, as in the case of measuring effective temperature?

The answers to questions such as these will go a long way towards shaping the design of the study and the way it is implemented.

THE DESIGN OF OCCUPANCY EXERCISE RESEARCH STUDIES

Occupancy exercise data can be derived from two basic types of studies: (1) descriptive studies and (2) experimental studies.

Descriptive Studies

Descriptive studies, as the name implies, are attempts to describe selected aspects of a particular social phenomenon, in this case a shelter stay, through the collection and analysis of data. What characterizes

the descriptive study is the absence of any attempt to manipulate or vary part of the exercise according to a research plan. A descriptive study examines the shelter stay as it unfolds "naturally."

An example of a hypothetical descriptive study may prove useful. An instructional staff decides that it would like to investigate whether any management problems occur during the shelter exercise that are not dealt with in the formal training sessions. The staff decides to gather data after every exercise by questioning the shelter manager staff, other shelterees, and observers or umpires. First they determine (1) exactly what is meant by management problems, (2) what kind of information will uncover the existence of management problems, and (3) what questions will provide this information. Then they develop three sets of questionnaires, one for the manager and his core staff, one for other shelterees, and one for the observer/umpire. The questionnaires are administered after the shelter stay. The analysis of questionnaire data from a number of occupancy exercises may reveal some potential management problems that are common to all exercises, some that are common to exercises with certain relevant features (e.g., children in-shelter, high temperatures), and others that appear unique to a specific situation (e.g., a case in which a sanitation kit liner tore along the seams).

A very large part of the research data generated by the shelter exercise will come from descriptive studies.

Although the descriptive study is generally the less complicated of the two types of research studies, it nonetheless requires careful preparation. It is not enough for the instructor merely to compose a number of questions on topics that are interesting to him and ask students to write down their answers during the post-shelter debriefing. Most of the steps in the occupancy research process, page 22, should be followed for even the least complicated descriptive survey of shelter behavior.

Experimental Studies

An experiment is any investigation involving manipulation or control of a variable and systematic observation of its results. No attempt

will be made here to describe the varieties of experimental methods currently available to behavioral scientists. Such methodology is summarized in the documents listed on page 24, especially (1), (2), and (8).

It is assumed that occupancy experiments will be designed by persons trained and skilled in the conduct of human behavioral experiments. This assumption is necessitated by the many pitfalls in behavioral experimentation, into which the inexperienced researcher may easily fall. The central difficulty is insuring that the variable being manipulated is not confounded with other factors which might influence the results. Such confounding can not only obscure the results but may lead to erroneous conclusions.

Most behavioral experiments involve statistical analysis and inference. In order for such analysis and inference to be appropriate, the statistical models must match the experimental design, that is, the assumptions underlying the statistical methods must be warranted. This means that, in general, an appropriate understanding of statistical methodology is required for effective design of behavioral experiments.

Beyond the question of designing experiments which will yeild warranted conclusions, there is the matter of designing efficient experiments. Some designs can be quite wasteful of time, money, subjects, and data as compared to more appropriate designs. Design of an efficient experiment may require a great deal of sophistication.

There are special problems in the design of occupancy-type experiments. Among these are:

1. Non-Independence of group members. Participants in a given occupancy exercise profoundly influence each other's behavior. This means that measures for a given participant cannot, in general, be assumed to be experimentally independent from those for other participants in the same exercise. This lack of independence complicates the selection and interpretation of behavioral measures.

2. Complexity of interacting variables. Almost any occupancy exercise will differ from another in a variety of inter-related ways. This

complicates the interpretation of results, in that it will usually not be a simple matter to define the specific differences between exercises that are being compared.

3. Sequential dependency of events. Shelter occupancy involves a series of related events, with subsequent events being influenced by earlier events. This makes difficult the design of experiments that appropriately control event sequences.

All of these factors reinforce the need for the participation of skilled experimental design personnel in the planning of specific occupancy experiments.

DATA COLLECTION

Factors to Consider in Data Collection

Most occupancy exercise research data will stem from the following sources.

1. The general shelter population.
2. Specific persons in-shelter, such as the shelter manager.
3. Members of the instructional staff, observers, umpires, and other special participants in the exercise.
4. Shelter records, either kept as a routine part of a shelter stay or maintained especially for research purposes.

The information from the first three sources will largely be based on responses to written questionnaires. Before such a questionnaire or any data collection instrument can be designed, certain decisions must be made by the investigator. The first of these has previously been discussed in the section on formulating the research problem, pages 7 and 8. It deals with the amount and types of information that the data gathering tools will have to supply in order to understand what happened during the shelter stay. What information is needed and is obtainable, to understand and evaluate the phenomena under investigation? This is not an easy decision to make. Let us assume that an investigator is

interested in measuring the extent of thirst caused by the carbohydrate supplement. A standard indicator of thirst is the amount of water that a person drinks. It may be unfeasible for training purposes to allow subjects to drink as much water as they wish whenever they wish in-shelter. An alternative is to gather information about the number of times a person feels thirsty and the intensity of this feeling. This can be accomplished by having a personal thirst record kept by each shelteree on which he makes an entry every time he feels thirsty. However, this serves to alert subjects to the fact that some study involving water, thirst, or something like that is being carried out, which may color his perceptions of how often and how intensely he feels thirsty. A third alternative is to question shelterees after the exercise. Here one may raise the issue as to how accurately an individual is able to reconstruct his feelings of thirst over a 24 or 48 hour period. The problem of defining a variable such as thirst so that it can be measured within the constraints of an occupancy exercise is not an insoluble one. However, because the entire research effort can stand or fall on this step, it requires thorough attention on the part of the research staff.

After determining what information is needed to measure the effects of the experimental variable, one proceeds to the issue of what specific questions should be asked of the subjects to obtain the necessary information. It is beyond the scope of this pamphlet to consider in detail the science and art of questionnaire construction. For this, the reader is directed to the sections on questionnaire design in any of the works cited in the reference section, page 24. However, it may be useful to idenfity briefly some of the major issues in questionnaire construction.

1. How many questions should be asked about the phenomenon under investigation?

Too few questions may lead to an incomplete understanding of the relationship under study. Too many questions may complicate the tasks of data gathering and data analysis.

2. What supporting questions must be asked, not directly related to the phenomenon under investigation?

Background information is necessary for analysis purposes. This includes such items as age, sex, education, occupation, CD experience, and many more, depending upon the specific study.

3. Can the respondents reasonably be expected to answer the questions?

A question may require knowledge that for one reason or other is unavailable to the respondent. For example, information on individual's body temperatures cannot be provided if there are no thermometers in-shelter. A question may impose unreasonable demands upon a respondent's memory, e.g., asking him to recall something that had taken place 48 hours ago. An inappropriately asked question may embarrass or antagonize a respondent. An example of this is an inquiry into an individual's sexual behavior or attitudes.

4. Are the questions worded in the best possible manner?

The wording of each question is an important consideration in questionnaire construction. If a question is worded not too broadly, or if it is phrased in too specific terms, the answers may not provide adequate information for analysis. A question may also be worded in a "loaded" or biased fashion that inadvertently directs the respondent to select one answer over another. This may occur when the question contains one specific example of the type of answer desired, as in the case, "were there any management problems in the shelter, such as racial tensions...?"

5. Are the questions arranged in the best possible order?

It has been frequently demonstrated that the manner in which individual questions are put together to form a questionnaire can have a decided effect upon the responses to those questions. If respondents are being asked to recall a series of events, it is desirable that the question reflect the time order of the events. Care must also be exercised to avoid having the answers to previous questions influence the

responses to questions that come later. Questions on "sensitive" issues should not be abruptly, initially "thrown at" the respondent, but should be led up to with prior non-controversial queries.

6. What form of responses will lead to the most useful data?

The two basic types of responses to questions are open-ended answers (free response) and checklist answers (controlled response). The former allows the respondent to answer the questions in his own words, while the latter provides pre-established categories (e.g., yes-no, multiple choice) into which the respondent fits his replies. The advantage of the checklist response is that it is much easier to work with in analyzing the data. The advantage of the free response is that it tends to get closer to what the respondent is actually thinking, by giving him free rein in responding. The "trade-off" between accurate representation of responses and manageability of data must be evaluated in terms of the objective of the study, the characteristics of the respondents, the available tools for data analysis, the available time, and other relevant dimensions of the research situation. One common solution is to combine the two approaches, by allowing the respondent to provide free response elaborations of his checklist answers.

Data Collection Instruments

Some of the data collection tools that appear feasible to use in occupancy exercise research studies are described below.

1. Standard occupancy exercise data forms. It is anticipated that one of the primary data collection tools will be a standard data form which will be filled out after every occupancy exercise by a person or persons most familiar with that particular shelter stay. See page 23 for information about an occupancy exercise research program that will utilize standard data forms.

2. Shelter records. A second source of research data lies in the records that are normally kept in a shelter stay. These include:

a. Shelteree registration form which supplies a good deal of background data, including skills related to CD.

b. Shelter log which lists the major planned and unanticipated events that occured during the shelter stay.

c. Medical log which lists:

   (1) the symptoms that shelterees considered severe enough to request treatment, and

   (2) the treatment that was administered.

d. Supply record which indicated the amount of shelter supplies consumed during the stay.

e. Additional logs, reflecting shelter capability, such as a temperature log, atmosphere component measurements, etc. This might also include supplies that have been brought into the shelter from surrounding areas, or personal belongings which shelterees have brought with them.

The research value of shelter records is diminished if persons responsible for record-keeping devote casual, half-hearted efforts to this task. Students should be made aware of the need to keep adequate records not only for research purposes during peacetime but primarily as part of training for decision making in emergencies.

3. Observer measurements and reports. Observations may be made by instructors, shelterees, or additional participants. The observers, themselves, may be either in or out of the shelter, depending upon the specific shelter and the nature of the problem under investigation. The main purpose will be to take measurements and to make records of specific in-shelter developments, activities, and incidents.

Examples of observer forms are:

a. A critical incident form, in which unanticipated in-shelter problems are recorded in detail.

b. Activity records, in which a description and evaluation of scheduled activites (e.g., feeding, training) can be entered in some detail.

c. Group behavior form in which the formal and informal structure of the group are recorded, at regular intervals.

A special case is the shelter diary, where each shelter occupant is asked to record his reactions to specific aspects of shelter living. The shelter diary can also contain questions on medical problems, individual consumption of supplies (food, water), use of sanitation facilities, etc.

4. Pre-shelter measures.

a. CD information and attitude test, to provide a baseline for evaluation of occupancy impact.

b. Shelter anticipation measure, to gauge the pre-entry expectations of the participants about the shelter stay.

c. Pre-occupancy physiological measures, such as weight and temperature.

5. Post-shelter instruments. Among the likely types of post-shelter tools are:

a. Instructor or observer description and evaluation of exercise, in which a non-participant, or a participant, observer summarizes the occupancy stay.

b. Shelteree evaluation form in which each participant in the shelter stay describes his behavior and reactions.

c. Shelter manager critique, in which the shelter manager reviews the exercise from his vantage point.

d. Premature exit form, to record details of any case in which a shelter occupant left before the scheduled exit time.

e. CD information and attitude test, to evaluate the impact of the occupancy experience on the participants.

f. Post-occupancy physiological measures.

6. Data gathering instruments for experimental manipulations. The forms described above are largely associated with descriptive reporting of data common to all occupancy exercises. When an experimental manipulation is planned, it will often be necessary to supplement the standard instruments with special data collection forms and devices developed for the particular study.

ANALYSIS AND INTERPRETATION OF RESULTS

After data have been collected, analysis and interpretation are the next steps in the research process. These are the steps that will enable the investigator to systematically organize the information accumulated in the study in order to provide a meaningful and standardized description of the relevant portions of the occupancy experience, which can be compared with data from previous shelter exercises. The analysis and interpretation phases provide the answers to the research questions formulated at the beginning of the study, and fit the answers into the context of previously available knowledge.

Some of the research procedures that are part of the activity called data analysis are (1) developing rules for classifying the raw data obtained from questionnaires, (2) coding and tabulating the data, and (3) performing the necessary statistical operations to summarize the data and to determine the reliability of generalizations made from the data.

The logic and techniques of occupancy exercise data anlysis are identical to those associated with research in the behavioral sciences. Because there are no obvious significant uniquenesses in occupancy exercise data that would a priori call for modification of the usual techniques of analysis, detailed discussion of such techniques are deemed outside the scope of this guide. A description of specific methods and tools of data analysis can be found in any of the research reference works that are listed at the end of this document.

Several general points should be made about analysis and interpretation of occupancy exercise data. The first is that many types of data will be gathered during the course of any occupancy research study. Hopefully, much of the information will be in short answer or checklist form, which allows for ease in analysis. However, it can be expected that important information will be contained in answers to open-ended questions that shelterees, shelter management staff members, and instructional staff members will provide. In selecting procedures for the analysis of occupancy

exercise data, the differences in types and sources of data must be taken into account. Clearly, these differences must also be considered in interpreting the research results.

The second point deals with the optimum level of sophistication in the statistical treatment of occupancy exercise data. Most shelter exercise studies will not warrant extensive statistical operations. Some of the reasons for this are: (1) the inherent limitations of the occupancy exercise as an experimental situation, (2) the pre-requisite for statistical training to employ the more complex techniques, and (3) the fact that most people who will be reading and using occupancy exercise research report will have little or no formal training in research methodology.

Finally, a word on interpretation of shelter exercise data. The constraints upon the occupancy exercise that were taken into account in formulating the research problem loom large in the interpretation of the meaning and significance of the research results. To the constraints imposed by the duration of the shelter stay, and the size and composition of the shelter population may be added a more general problem in data interpretation. This concerns the generalizability of data derived from peacetime research studies to hypothetical behavior under wartime conditions. The interpretation of shelter exercise research findings must be tempered by a consideration of the likely differences between a 24-48 hour training exercise and shelter occupancy under actual emergency conditions.

Although the differences between peacetime and wartime behavior may indeed be vast, the research analyst is not without resources to assist him in interpreting occupancy exercise data. For one thing, must research dealing with the performance of military personnel and material is faced with the problem of generating hypotheses about wartime environments and behavior from peacetime research. Out of this research setting have emerged skills and knowledge that are directly applicable to the interpretation of occupancy exercise data. Secondly, an increasing amount of information is becoming available on the social effects of natural disasters. Comparison between shelter research findings and the results of

disaster field studies should prove of great value in assisting the analyst in interpreting occupancy exercise data. For the most part, civil defense training staffs will not have the responsibility for dealing with the over-all problem of interpretation of shelter research data. However, many training staffs will be using the results of occupancy exercise research in one way or another, and should therefore be aware of the generalizability issue.

SAMPLE OCCUPANCY EXCERCISE RESEARCH IDEAS

The following are examples of research ideas that can be explored in the occupancy exercise with little or no difficulty. The studies all have to do with OCD stocks. It should be stressed that the capability of occupancy exercise research far exceeds that indicated by the research ideas described below. The modest proposals have been intentionally selected, for several reasons. First is the matter of practicality. Millions of dollars have been invested in the production and distribution of OCD supplies. Occupancy exercise research affords an opportunity to gain information about the adequacy in use of these stocks on a scale, and with an ease, hitherto unattained. The second factor is that of validity, in the sense of the identity between occupancy exercise behavior, and anticipated behavior under conditions of nuclear attack. The studies suggested below are relatively unaffected by the limitations of peacetime occupancy exercises.

Study of Sanitation Kit Use

In its current series of experimental studies on shelter management factors, the American Institutes for Research ran two groups that were required to organize themselves in the absence of a trained manager. In each case, faulty procedures in regard to sanitation led to situations that could cause serious problems for management.

The first problem dealt with the interpretation of the instructions on the plastic bottle of Weladyne disinfectant. In one study, five gallons

of drinking water, and in the second study somewhat less than that, were poured into the empty sanitation kit because the directions on the Weladyne bottle read "3 ounces for 5 gallons." That these were directions for normal use as a disinfectant was not noticed by either of the persons who set up the sanitation kit, one of whom was a high school science teacher, and the other an undergraduate physics student. The special civil defense instructions were hidden under the list of ingredients, where one might not reasonably expect directions to be. This would be an insignificant "nit picking" issue if it were not for the fact that five gallons of water represents a one week water ration for almost three people.

The second incident stemmed from the procedure adopted by one group of putting the original cover of the sanitation kit tightly over the commode after each use of the toilet. The constant removal and return of the lid evidently stretched the poly liner, with the result that the liner tore along a seam, causing a sanitation emergency.

These incidents far from exhaust the problems associated with the sanitation kit.

A study of sanitation kit use can be carried out using occupancy exercises, especially those with added untrained volunteer shelterees.

Each shelteree would provide data on his use of the toilet facilities and reaction to them. The shelter manager and/or staff umpire would provide information on sanitation from the management point of view.

The Water Siphoning Problem

This, as indicated previously, is a classic "human factors" problem in the utilization of shelter facilities. A survey of procedures adopted in all occupancy exercises might uncover suggestions for the easy siphoning of water, so that (1) women and children especially might accomplish this task without having to resort to sucking the tube, and (2) the Office of Civil Defense might be spared any additional cost in remedying the situation by replacing or supplementing the currently stocked hose. The ingenuity that has been uncovered among the shelter management instructional staffs would permit optimism about an efficient solution to this problem.

Condition and Distribution of the Carbohydrate Supplement

1. It has been reported that under conditions of high temperature the individual supplement drops combine into a mass that becomes difficult to separate, thus causing problems from the standpoint of sanitation and equitable distribution.

Occupancy exercise reports on the condition of the carbohydrate supplement in different parts of the country at different times of the year would indicate how widespread the above mentioned problem is, and would probably uncover solutions to it.

2. The distribution of the supplement is complicated by the fact that not enough polyethelyne bags are stocked to provide one per shelteree. As a result, improvised methods for distribution and storage of the drops are required. Supplement drops have been stored in hands, pockets, extra drinking cups, and waxed paper from the survival rations. A survey of occupancy exercise experience might reveal additional, more efficient methods of personal handling of the drops.

3. There are two schools of thought on the apportionment of the carbohydrate supplement. The majority point of view calls for distribution of the drops at scheduled mealtimes; the minority view calls for once a day distribution so that shelterees can consume the drops whenever they see fit.

The experimental manipulations of this variable could easily be accomplished within the framework of the occupancy exercise. This should lead to comparative data on shelteree acceptance of the supplement, sanitation, food distribution, and management problems.

Condition of the Survival Ration

In a recent A·I·R occupancy stay, it was discovered that in one five gallon tin of survival rations, the number of 2" x 4" crackers in a waxed paper unit ranged from 13-16. Because the waxed paper unit is frequently, if erroneously, used as a basis for distributing the rations, variability in the content of the unit could cause problems for shelter management.

Much more common than variability in number of crackers is variability in taste and appearance within each type of survival ration.

Occupancy exercises could be profitably used as a nation-wide sample from which data on the condition (number, appearance, taste) of OCD stocks could be gathered on a regular basis.

Dual-Purpose Use of Supplies

An important management guideline is that every item in-shelter be examined for possible additional uses after its primary purpose has been achieved. A recent OCD memo (SMS-57, 31 January, 1964) described an improvised male urinal constructed from two five gallon food tins in a food carton.

The occupancy exercise has two possible roles in regard to dual-purpose supplies. On one hand, the exercise can be used as a vehicle for testing dual-purpose supply recommendations such as the urinal. The large number of widely diversified subjects to be found in a sample of exercises can put any dual-purpose recommendations to a serious test.

Secondly, the exercise can be used as a source of recommendations about improvised use of supplies. Here, too, the heterogeneity of the subject population, plus the ingenuity of the training staffs, can be expected to generate many secondary and tertiary uses for items supplied by the Office of Civil Defense.

STEPS IN OCCUPANCY EXERCISE RESEARCH PLANNING

As a form of summary of the content of this pamphlet, this section presents a list of the steps that should be taken by anyone responsible for planning a shelter exercise research study.

1. Identify the research problem.
2. Assess its research implications (why study the problem).
3. Determine whether the problem can be studied within the constraints of the occupancy exercise.

4. Identify the major variables of the study, and formulate the hypothesis, if one is to be tested.
5. Determine what information is needed to understand and evaluate the phenomenon under investigation.
6. Determine the appropriate research design.
7. Develop the necessary data collection instruments, or select existing instruments, where feasible.
8. Determine how many and what types of shelterees should be included in the sample.
9. Plan the experimental manipulation to the fullest detail possible (who does what, when, where, how frequently, to whom).
10. Modify the shelter schedule and scenario to accomodate the experimental treatment (keeping the control group and experimental group schedules as identical as possible).
11. Provide briefings to persons on the staff or among the shelterees who must be informed about the study (if feasible, keep knowledge of study from shelterees during the shelter stay).
12. Conduct the experiment.
13. Collect the data.
14. Determine what techniques of analysis are appropriate and implement them.
15. Prepare and make available the results of the study, the conclusions reached, and the interpretation of the findings.
16. Keep written records of the study.

AN OCCUPANCY EXERCISE RESEARCH PROGRAM

The Office of Civil Defense is initiating a project to establish a program of occupancy exercise research as a test of the feasibility of this approach. Under this program, data from the hundreds of shelter exercises that take place every year in the U. S. would be transmitted to an Occupancy Exercise Data Center where they would be analyzed using various methods of automatic data processing.

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APPENDIX A:

SAMPLE OCCUPANCY EXERCISE DATA CATEGORIES

SAMPLE OCCUPANCY EXERCISE DATA CATEGORIES

I. OCD Supplies

A. Condition of Supplies

1. Items missing
2. Incorrect amounts
3. Incorrect items
4. Items below minimum standards
5. Improper packaging
6. Variability

B. Operational Procedures

1. Preparation
2. Distribution
3. Consumption/use
4. Disposal
5. Storage
6. Instructions

C. Management Factors

1. Scheduling
2. Rationing/apportionment
3. Shelteree acceptance
4. Multi-purpose use
5. Security

II. Non-OCD Equipment, Facilities and Supplies Available in Shelter[1]

A. Type of Equipment, Facilities and Supply

1. Ventilation
2. Sleeping
3. Communication
4. Illumination
5. Power
6. Training
7. Recreation
8. Fire, rescue, repair
9. Security
10. Food (Other than OCD)
11. Water (Other than OCD)
12. Sanitation (Other than OCD)
13. Medical (Other than OCD)
14. Radiological (Other than OCD)
15. Others

B. Location/ownership

1. Stocked in shelter
2. In building; near shelter
3. Brought in by shelterees

C. Inventory Data

1. Number
2. Type
3. Condition

[1]This refers only to supplies and equipment that are stocked in an actual shelter that is being used for training purposes.

D. Operational Procedures

1. Preparation
2. Distribution
3. Consumption/use
4. Disposal
5. Storage
6. Instructions

E. Management Factors

1. Scheduling of equipment/supply use
2. Rationing/apportionment
3. Acceptance
4. Milti-purpose use
5. Security

III. Shelter Structure and Physical Environment

A. Dimensions

B. Configuration

1. Single space vs. multiple space
2. Horizontal vs. vertical space
3. Numbers of rooms

C. Per person space

D. Above ground/below ground

E. Special problems related to shelter structure

1. Temperature & atmosphere
2. Illumination
3. Communication
4. Noise
5. Moisture
6. Storage

IV. Shelteree Characteristics and Behavior

A. Background Characteristics

1. Age
2. Sex
3. Religious ethnic background
4. Occupation
5. Education
6. Skills related to CD
7. Reason for taking course

B. Physical/medical Reactions

1. Weight change
2. Illness & injuries
   - Types
   - Severity
   - Treatment
   - Effectiveness of treatment

C. Use of Facilities/Supplies

1. Food, water, recreational materials, amount, type used/consumed
2. Sanitation, number times used to urinate, defecate, other use, when used.
3. Other facilities, supplies

D. Reactions to occupancy exercise

1. Reaction to following aspects of exercise:

a. Behavior of others
b. Communication messages
c. Food
d. Heat and humidity
e. Instructor, umpire
f. Keeping active
g. Length of shelter stay
h. Lighting
i. Noise
j. Odor
k. Personal cleanliness
l. Physical exercise
m. Privacy
n. Realism of exercise
o. Radiological activities
p. Recreation/free time
q. Religious activities
r. Schedule of activities
s. Seating
t. Simulated emergencies
u. Shelter cleanliness
v. Shelter living groups
w. Shelter management staff
x. Shelter manager
y. Shelter teams
z. Sleep
aa. Smoking
bb. Space per person
cc. Toilet facilities
dd. Training
ee. Water

2. Specific problems in regard to above aspects

3. Recommended solutions to above problems

V. Management Characteristics and Behavior

A. Age of shelter manager

B. Sex of shelter manager

C. Occupation of shelter manager

D. Education of shelter manager

E. Previous management experience

F. Amount of pre-occupancy training

G. Manner in which selected

H. Leadership style

1. "Authoritarian"[1]
2. "Democratic"
3. "Laissez faire"
4. Other or combined

I. Secondary management structure (core management staff)

1. Age of core staff members
2. Sex of core staff members
3. Occupation of core staff members
4. Education of core staff members
5. Previous management experience
6. Amount of pre-occupancy training
7. Manner in which selected
8. Leadership style

[1]For the meaning of these terms and the context in which they are used see Hare, Handbook of Small Group Research, pp. 309-316

J. Major Management Problems

1. Planned simulated emergencies
2. Unplanned problems

K. Management decisions and actions in response to problems

L. Results of management decisions/actions

M. Extent and nature of informal shelter leadership

1. Informal leaders
2. Basis for emergence
3. Relationship between formal and informal leadership

VI. Shelter Organization

A. Task teams

1. Number and types of teams
2. Size of team
3. Time formed
4. Number of shifts
5. Method of selection of team head and members
6. Extent of reassignments
7. Special problems in relation to team performance

B. Community organization (Units, Sections, Divisions)

1. Number and type of community groups
2. Size of community groups
3. Time formed
4. Method of selection of group head and group members
5. Extent of reassignments
6. Major interaction patterns within and between groups
7. Special problems in relation to community groups

C. Other formal groups (e.g., advisory committees)

D. Informal organization

1. Nature and extent of informal organization in task teams
2. Nature and extent of informal organization in community groups

E. Communication channels and patterns of communication

VII. Shelter Operations

A. Types of activities

1. Radiological protection
2. Atmosphere & temperature control
3. Provision of food and water
4. Sleeping
5. Medical care
6. Sanitation
7. Communication
8. Management of supplies
9. Security & safety
10. Administration
11. Training
12. Recreation (planned/free time)
13. Religious
14. Psychological support
15. Other

B. Schedule of activities

C. Problems in conducting shelter activities

1. Problems of implementation
2. Problems of acceptance

VIII. Simulated Emergencies

A. Types of emergencies

1. Radiation emergencies
2. Fire/smoke/fumes
3. Illness/injury/death
4. Psychological problems
5. Social control problems
6. Overcrowding problems
7. Atmosphere & temperature emergencies
8. Equipment failures
9. Supply emergencies
10. Rescue & repair emergencies
11. External emergencies
12. Other

B. Impact upon shelterees

C. Solution to emergencies

IX. Exercise Evaluation

A. Length of exercise

B. Austerity

C. Realism

D. Training benefits

E. Role of instructional staffs

F. Student attitudes and performance

G. High points and weak points

H. Suggested modifications